

Patent claims:

1. A cooling element, in particular for use in walls  
of furnaces that are subjected to high levels of  
5 thermal stress, consisting of cast copper or a low-  
alloyed copper alloy, with coolant channels which  
comprise tubes cast in the copper or the copper  
alloy and are arranged inside the said cooling  
element, characterized in that the tubes of the  
10 coolant channels are provided with an electrolytic  
coating on their outer side.
2. The cooling element as claimed in claim 1,  
characterized in that the tubes are copper tubes,  
15 and in that the coating is an electrodeposited  
nickel coating.
3. The cooling element as claimed in claim 1 or claim  
2, characterized in that the thickness of the  
20 coating is between 3 and 12  $\mu\text{m}$ , preferably between  
6 and 10  $\mu\text{m}$ .
4. The cooling element as claimed in claim 1,  
characterized in that the tubes are copper-nickel  
25 tubes with a copper content of 30 to 70% and a  
nickel content of 20 to 65%, and in that the  
coating is a copper coating.
5. A method for producing a cooling element provided  
30 inside with coolant channels formed from tubes, in  
particular for use in walls of furnaces that are  
subjected to high levels of thermal stress, with  
the steps of
  - a) fabricating the tube, including all desired  
35 curves, branches and similar flow structures,
  - b) casting molten copper or copper alloy around  
the tubes within a casting mold, with

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preferably simultaneous cooling of the inner walls of the tubes,

c) cooling the copper melt,

5 characterized in that in the fabrication of the tubes at least those regions of the outer sides of the tubes around which the copper or the copper alloy is later cast are electrolytically coated.

10 6. The method as claimed in claim 5, characterized in that the tubes are coated only after the desired form of tube has been fabricated.

15 7. The method as claimed in claim 5 or claim 6, characterized in that the outer sides of the tubes are mechanically blasted before the coating, preferably by blasting with coarse glass granules.

20 8. The method as claimed in one of claims 5 to 7, characterized in that the coated outer sides of the tubes are degreased, preferably by cleaning with acetone, before the tubes are surrounded by casting.

25 9. The method as claimed in one of claims 5 to 8, characterized in that the tubes used are copper tubes, and in that the coating of the outer sides of the tubes takes place in an electrolytic nickel bath.

30 10. The method as claimed in one of claims 5 to 9, characterized in that the thickness of the electrodeposited layer is between 3 and 12  $\mu\text{m}$ , preferably between 6 and 10  $\mu\text{m}$ .

35 11. The method as claimed in one of claims 5 to 8, characterized in that the tubes used are copper-nickel tubes with a copper content of 30 to 70% and a nickel content of 20 to 65%, and in that the

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coating of the outer sides of the tubes takes place in an electrolytic copper bath.

12. The method as claimed in claim 11, characterized in  
5 that the copper-nickel tubes used have a copper content of 31% and a nickel content of 63% (Monel tubes).